STARTING AND LIGHTING SYSTEM TROUBLES FIXED

The Thirtieth of a Series of Articles by an Expert for the Automobile Owner.

By WALTER SHIELDS.

The average automobile owner is fearful that something may happen to his
electric starting and lighting system
because he knows so little about the
actual process for finding and remedying the trouble. It is quite true that
to this owner electrical complication
is much worse than mechanical complication, yet with a reasonable amount of
sendy the average wiring diagram is out bulbs or starting motor easily and. In some instances the owner of experience, otherwise greater dam-age may result. Since interent battery troubles were discussed in a previous article they will not be gone into here. The electric starting and lighting system of a car consists principally of a generator and a starting motor as generator and a starting motor as scenarate units or combined in one, a storage battery, which is charged by the generator, to feed its current to the lamps and starting motor; a cutout which connects and disconnects the which connects and disconnects the the generator from the battery at slow engine speeds; a current controlling de-vice for permitting the charging rate

to be as required, wiring to and from these parts to the switches, larsps, &c. At the present time both single and two unit systems are in use, the former being a motor generator in which both

There is on the dash of most cars a charge-discharge meter or its equivalent, that is some means by which the driver can tell how the current generation system is functioning. This meter tells when the battery is being charged and discharged. This meter may get out of order, and thus the owner must trust to luck that the system is work. ins. When the starting pedal is pressed the meter shows discharge because current is being drawn from the battery. Whenever the battery is discharging current this meter will show it. Many of these meters are constructed on the order of an ammeter, in fact some merely are assumeters and hence are subject to their ills. When the engine is not running and there is no load on the battery, that is when the lights are not burning the indicating hand of the meter should show were. If it does not either the hand is bent if it be of the hand indicating type or the magnet of the instrument may weak, or the return spring may r the magnet of the instrument weak, or the return spring may of the right tension. If there is slight error it does not matter this can be corrected for over cale, but where it is great the inrouble 'n in the regulation. In the visuality is saile, but where the interrupter points on a magneto. The usual for magnetic fire bard or the hand or it he spring which returns the hand or the spring which returns the spring which returns the spring to the spring which returns the spring which returns the spring to the spring which returns the spring which returns the spring to the spring which returns the spring to the spring t that it may after being injured indicate slower than before, not at all, or the Indicating hand will not return to zero as it should. In some instruments there is an adjustment for the hand or

to find and correct that many with the owner already is familiar. ircuits or shorts. In the former ters is no current flow at all and latter flow in the wrong direction ch the actual load is avoided, as one bare wire touches another of

Because of the greater chance for open or shorts in the wiring it is of utmost importance that the wires be inspected at intervals to see that they are in-sulated throughout their length. Often

chaing of a wire causes a ground which prevents the current from flowing to the part needing it. part needing it.

There are two types of wiring systems in use, called respectively the single and double wire. In the latter one wire is used to carry the current to the part requiring it and another used to complete the circuit back to the source. In the single wire there is one feeding wire to the part and the return circuit is established through the mail work of the to the part and the return circuit is es-tablished through the metal work of the car. It is obvious that in the single wire system if one wire has poor insula-tion and the bare spot touches the frame there will be a short circuit, and if it is the lamp circuit the lamp will not burn at all. It is more difficult to cause a short the tree will be a short or some and the state of short in the two wire system because here two wires must be broken down. Dirty, loose and corroded terminals are responsible for a lot of trouble. One losse connection may cause endless worry, a corroded battery terminal or other important terminal may prevent the operation of a unit of the whole system or throw the whole out of opera-

When the lamps do not burn at all and at the same time the starter is weak he can't ne same time the starter is weak in cranking the engine, the trouble may be looked for at the battery. If the lamps do not burn at all but the starter works well then the battery is all right and the trouble is in the lighting system itself. One may start at either end—at the bulbs and work back to the batter. tery, or at the latter and work to the the well known Detroit car. Mr. Morrow. on his return from a trip to the
row. on his return from a trip to the
Pacific coast last week, bought out his
associates in the Saxon Motor Company
of New York and took over complete
conversity of the company.
Mr. Morrow returned to New York the hulb is all right the trouble may in the base. The contact point may very dirty or the lamp may not be said of the contact with the terminal in the said of the contact with the terminal in the said of the contact points may be loose, the contact points may be loosed.

ation, yet with a reasonable amount of the average wiring diagram is cause of dirt, poor adjustment, &c., and hence when the circuit is traced to the in the generator, fuses, the switches, which the latter should be carefully

switch the latter should be carefully examined. The lighting wires from the battery may be shorted or grounded or the connections may be poor.

In tracing any trouble it always is best to have a wiring diagram before you, so that you can trace each circuit carefully. If readers of The Sun require wiring diagrams of their cars they may have them upon inquiry.

One lamp may burn more brightly than another and again both lamps may burn dimly or perhaps fileker. In the average

connector or one of the wires and the jarring causes intermittent contact to be made. In the Ford system there may be flickering due to fluctuation of magneto output. When one bulb burns brightly and another dim it usually is caused by a poor bulb. This brings up the importance of always getting the same kind and if consults the same make of bulbs. and if possible the same make of hulbs.
If the bulb resistances are far different
there may be as much difference in their
brightness. If a bulb of the wrong capaand the same machine, while in the latter they are separate units, with the starting motor near the flywheel, which has teith upon its rim, and the generator coupled to some moving shaft. In so called double teck units which appears as a single unit the starting motor may be mounted on top of the generator. There are a variety of types of generators, starting motors and methods of engagement with the flywheel, cutouts, current controls and wiring, so that if the information herein given is not specific enough readers should make inquiry to Tar Sun, inclosing a stamped addressed envelope.

There is on the dash of most cars a charge-discharge meter or its equivalent, that is some while he starting but has been cases instantly. Dim burning of both lamps may be a sign that the battery is low, and is a sure sign of that when the starter is weak also. This may mean that a generator or the current controlling device is at fault. The average owner can make a test of the generator at the terminals by connecting in a voltmeter while the generator is turning over. No indication will show the trouble in the generator and this means that experienced hands had better do the work. The best the owner can do is to examine the brushes

the trouble here may be with the brushes. In some systems there is in-herent- regulation which means expert help is needed if one is sure that the trouble 'n in the regulation. In the

for the spring which returns the hand to rero, but where permanent correc-tion dennot be made in this way the

clos dennot be made in this way the meter had better be given to one who understands its internal mechanism.

Mechanical troubles in the starting and lighting system are few. The starting motor is the two units themselves, trouble in the linkage or gesting and an mechanical governors, and in an or kerosene, was poured into out operates at the wrong time, and if one of the special Maxwell red test tanks. This actually ran the car for term the starting motor is the two units themselves, trouble in the linkage may be the switch may stick, or if there is method to prove it possible to eliminate and an all of the content of the cunt of the content of the cunt of this kind of trouble is no more of find and correct that many with the corrections must be clean and bright the correction the linkage may be considered. the owner already is familiar, and the cables running to the battery should be perfectly insulated with not should be perfectly insulated with not even a strand showing, and the connections and the cables running to the battery should be clean and



GEORGE S. MORROW. cause the trouble in so many cases is found in the bulbs. If these are burned cut through excessive voltage or by of New York, Eastern distributors for weak filaments they naturally require the well known Detroit car. Mr. Morth of the Sure Entire Electrical System

be very dirty or the lamp may not be making contact with the terminal in the lamp. Go hack further to the contact points may he loose, the contact points may be laidly correded. The wiring back to the wiring has been and fall.

The metal to which it is attached. If a the circuit is abouted at the brown has may be that the circuit is abouted may be that the circuit is abouted at this box, or the connections become which wiring carefully and received the wiring carefully and received the whole wiring carefully and received the metal to which it is stratched.

If the wires lead to a junction box have may be that the circuit is abouted at this box, or the connections have may be that the circuit is abouted at this box, or the connections have may be that the circuit is abouted at this box, or the connections have may be that the circuit is abouted at this box, or the connections have been in the severy indication that September will be one of the whole wiring carefully and received the many determined the most of the connection and the most connection the poor or correded. If after a new fuse is intaked in the line the fuse may have bloom or the fuse connection be poor or correded. If after a new fuse is intaked in the line the fuse may have bloom or the fuse connection be poor or correded. If after a new fuse is intaked in the line the fuse but in the fuse of not only the local retail business, shown on a short time the fuse of not contact the fuse of the subtrey is bilamed for late of the fuse o

Chandler Car in Long High Gear Run.



One of the Chandler dealers in Pennsylvania wired the Brady-Murray Mostors Corporation here on Monday: "We fair of yours was very sudden. We have removed first and intermediate gear about 2 P. M. to-morrow."

"Reception? We didn't come for a reception."
"Reception? We didn't come for a rece

Important Test Shows That

"Half and Half" Mixture

Will Work.

proved this week in a test con-

ing to the account appearing to-day in that well-known trade paper a gallon of mixed fuel, consisting half of gasolene and half of kerosene, was poured into

one of the special Maxwell red test tanks. This actually ran the car for twenty-ight miles. Just before a gallon of as pure gasolene as can be bought

sene was poured into the tank. This lasted for 22.6 miles. Harry J. De Rear, manager of the local Maxwell branch, was highly pleased with the results of

here, after reasonable for the second street some going."

The car arrived at Sixty-second street and Broadway at 1.20 instead of 1 o'clock on Tuesday, having covered the 502 miles in high gear in fifteen and a which Farmer told how the Mayor of half hours actual running time. Samuel Farmer, the Eric dealer was at the wheel, with Walter Paffenbach at his club saw him off from in front of the west until I find a hill I can't climb in high gear, then I'm coming back."

"It was a regular ride, and we found the clity Sealer of Weights and Measures had officially sealed the transmission. The route lay through Westfield, Jamestown and Horsel."

Then there was an interval during for the sealer through without any sign of trouble. "Well, I'm off now," said Farmer. Clib saw him off from in front of the City Sealer of Weights and Measures had officially sealed the transmission. The route lay through Westfield, Jamestown and Horsel.

very readily and advise the motorist as

TRUCKS COME UNDER

Every Farm's Equipment,

Says Expert.

agricultural uses; (2) to provide for purchase of equipment, fertilizers

so small a proportion of the total mile-age that its elimination would save at the most only 10 per cent. of the gaso-lene produced in the entire country, for

One of the Chandler dealers in Penn-, "But what's the idea" inquired the nell to Binghamton, 208 miles, and was

work properly is not always due to a weak battery. It is possible for starters to get out of order, for wires to become short circuited and for contracts and KEROSENE AND 'GAS' MAXWELL IN BIG ARE GOOD MIXTURES switches to wear out. Often the apparent failure of a battery to hold its own is due entirely to a short circuit in

the electrical system which causes a constant drain on the battery's vitality.

"Irregularities in the operation of the With A. A. U. Official Car electrical equipment should be attended to at once as almost invariably they affect the battery in one way or another. Makes Record Run From Our battery men at 206-8 Amsterdam avenue can usually locate the trouble Washington, D. C.

With James A. Hemstreet, director of touring for the American Automobile Association, acting officially as observer and pilot a Maxwell touring car in a run from Washington to New York last Tuesday attained the most complete reliability score that has ever been checked off for accurate records covering an automobile performance test for the United States army service.

The car left Washington at 9 A. M.

Its run, requested by Adjt.-Gen L. W. Stotesbury of New York, was to duplicate a rip any army commander Recognized as Regular Part of might make in a day in the field of war. The Maxwell was to maintain a schedule of thirty miles an hour and it was to arrive at fixed points at given minutes. If the car arrived at these points either before or after the minute fixed points were to be charged against it. It was assumed. Addt-Gen. Stotesevidence showing that the motor truck has acquired a recognized place in the

should be perfectly insulated with not even a strand showing, and the connections at the battery should be clean and tight.

On Deck Again.

On Deck Again.

On Deck Again.

On Deck Again.

On Deck Again. used, it is the half and half that is liked best, and is to be recommended to Maxwell owners who wish to aid the Government by saving gasolene and yet do not find it possible to cut down their mileage.

That many motorists, not only Maxwellies, but in fact the majority of owners, are in exactly this position is pointed out by Automobile Fopics. As a result of careful investigation this trade authority declared, immediately after Van H. Manning of the Bureau of Mines issued his appeal for elimination of "joy riding," that purely pleasure riding was so small a proportion of the total milescape they trade the trade of the most satisfying and for agricultural uses; (2) to provide for the purchase of equipment, fertilizers test of automobile efficiency and reliability mark for the money it must be shown that it is essential equipment for farm operation. That many motorists, not only Maxwell and the result was a 100 per cent. Hondon the result was a 100 per cent. This achievement was attained despite the traffic delays and the ups both in Baltimore and Philadelphia, in which cities miles of downtown streets reduced the most satisfying agricultural uses; (2) to provide for most interesting and the most satisfying the purchase of equipment, fertilizers

the car's schedule of thirty miles an hour.

"This remarkable run provided the most interesting and the most satisfying test of automobile efficiency that it has ever fallen to my lot to check off." Hemstreet said. "It was the severest test I think that a motor car ever has been put to for an efficiency mark. The Adjutant set a hard task for the Maxwell, and any one familiar with this part whatever purpose. A saving of 50 per cent, of the automobile consumption in provement of the land, and (4) to pay this one method of using half and half whatever purpose. A saving of 50 per cent. of the automobile consumption in this one method of using half and half for fuel would be the biggest economy that the motorists of the country could effect, and it can be done, as the tests just made prove, without interfering with the use of cars for any purpose whatever.

It is expected that a campaign for the use of half and half will be set in motion by the various automobile manufacturers, many of whom are urging their dealers to instruct all their customers how to get the greatest possible mileage per gallon by suitable carbureter adjustments, elimination of leaks and idle running.

"It is certain that there has been not of the land, and (4) to pay the part of the country will appreciate what the former should among the things be wished to buy with the money the classification of equipment. The applicant for a loan through a Spokane bank included among the things be wished to buy with the money the classification of equipment. The applicant for a loan through a Spokane bank included among the things be wished to buy with the motor vehicle should well, and any one familiar with this part of the country will appreciate what the perfect score I was glad to give it. This is the schedule of stops the Maxwell made.

Stop 1—At forty-five miles by speed-or on the farm, and that the former should go to market and the perfect score I was glad to give it. This is the schedule of stops the Maxwell made.

Stop 1—At forty-five miles by speed-or on the farm, and that the former should go to market and the perfect score I was glad to give it. This is the schedule of stops the Maxwell made.

Stop 1—At forty-five miles a hard task for the Maxwell, and any one familiar with this part of the country will appreciate what the cassification of equipment is the classification of equipment and the classification of the country will appreciate what the cassification of the country will appreciate what the well and any one familiar with this come under the classification of the country wi

chinery of much more importance than the development of the motor truck. Its uses can be numbered by the score. It not only enables the formula of the score.

bon't starve your battery.

The storage battery plays an important part in the electrical system of the moder automobile, but it is only a part of the system and is dependent upon the satisfactory operation of other units to do its work properly. How the battery is affected by irregularities in other parts of the system is explained by A. E. Ward of the Prest-O-Lite battery service station.

"The electrical system of an automobile but he straight the modern of the modern of the modern of the modern of the system is explained by A. E. Ward of the Prest-O-Lite battery service station.

"The electrical system of an automobile but it is a useful piece of farm caption of other units to do its work properly. How the battery is affected by irregularities in other parts of the system is explained by A. E. Ward of the Prest-O-Lite battery service station.

"The electrical system of an automobile but it is a useful piece of farm equipment is borne out by the number of Federal farm loans made for its purchase. It has taken the product to marks the product to marks the product to marks and the effort it can be devoted to many other units to do its work properly. How the battery is affected by irregularities in other parts of the system is explained by A. E. Ward of the Prest-O-Lite battery service station.

"The motor truck is just coming into its own and the most conservative banks are much as much as model and reach New York at the ferry two minutes ahead of time to catch the boat and reach New York at the ferry two minutes ahead of time to catch the boat by two minutes are much as Explained by A. E. Ward of the Fresh.

Lite battery service station.

"The electrical system of an automobile might be compared to a chain in which the storage battery is the middle link. Satisfactory operation of the battery is very necessary to the strength of the chain, but, like a chain link, the battery's usefulness is dependent.

SAXON'S ECONOMY RECORD.

5. P. M. The car arrived at exactly 4.52.

It missed the boat by two minutes. When Hemstreet checked out his figures and mileage for the second time he established that the minutes was exactly the scheduled time for arrival at the ferry.

In this unusual run a letter was carried from Major-Gen. W. A. Mann, chief

Averaged 27.19 Miles to Gallon for 12,156 Miles.

The Saxon "boundary roadster" has completed its journey around the rim of the country and blazed the trail for a new record in its first military demonstrates. a new record in its first military demon-stration of durability. In both runs the car was equipped with United States chain tread tires, which likewise es-tablished a perfect score, the same four tires having made the return trip.

More Dodges for Army. The Government supply of Dodge Broatouring cars was increased last week by twelve more care ordered from the Colt-Stratton company, local Dodge Broatesiers.

BEAUTY APPEALS TO WOMEN BUYERS

And That Is Why Paige Co. Builds a Beautiful

"The demand of the American woman "The demand of the American woman for beauty in the automobile she drives or rides in has been one of the prime factors in the development of motor cars," says Harry M. Jewett, president of the Palge-Detroit Motor Car Company. "Our efforts to meet that demand have been one of the principal reasons for our own progress and exreasons for our own progress and ex-plain to a large degree such measure of popularity we may have won.
"The woman prospective buyer de-

"The woman prospective buyer de-mands first that her automobile shall be a beautiful car, second that it shall be an easy riding car, third an easy car to control and fourth that the power flow shall be flexible. "These simple phrases, which appear be so easy to understand, represent

to the trained automobile engineer a complex series of technical requirements. They have all been analyzed at the Paige factory and steps taken to meet

"For example, in the matter of easy convertible winter top and the pleasur riding the foundation of Paige reputation is the original Paige cantilever. As now produced the Liberty cars future.

taken care of by providing a smoothly working clutch, easy gear shifting, smoothly acting brakes and conveniently arranged controlling devices. The fiexi-bility of power flow, which gives the car an ability to skim over the steep hills on high or to drop to a walking pace in stiff traffic was perhaps the hardest of the engineering problems, and present achievements in this direc-

hardest or the engineering problems, and present achievements in this direction are the result of the concentrated effort of highly skilled technical men.

"The public now profits by these qualities that add so much to motoring enjoyment, but they can have little realization of the labor entailed in realizing them. The good work goes on and each them. The good work goes on and each year finds additional refinements."

TWO NEW LIBERTY MODELS.

Pive Passenger Sedan and Lan-

daulet Are Added.

Two new models, a five passenger sedam and landaulet, are anounced by J. E. Fleids, director of sales of the Liberty Motor Car Company, as additions to the Liberty line of cars. This brings the number of models up to six. The other standard types which have brings the number of models up to six.

The other standard types which have been produced from the start are the five passenger touring, four passenger teres and Broadway, advises prospective roadster, five passenger touring with convertible winter top and the brougham.

Albert Hirst, president of the Albert Hirst, president of the Albert Hirst, inc., Ford agency, at Sixty-eighth the tree tree and Broadway, advises prospective for both pleasure and commercial cars at once. This advice is given on account of a possible shortage of cars in the immediate future.

spring suspension, supplomented by seats and seat springs designed to produce the maximum of comfort and which represent a development of several years experience.

The matter of ease of control is sign. In elaboration of this point he states that the cars as produced have achieved the results in the way of per-formance, which their designers aimed for, and that consequently no material changes are incorporated in the present

KING 8'S NEW TERRITORY.

Local Agency Gets Large Part of

The selling territory of the King Car Corporation, distributors of the King Eight, has been materially extended. Eight, has been materially extended.
Joseph D. Porter, manager of the local organization, received word from the factory during the past week that in addition to the metropolitan district the headquarters at Broadway and Fifty-second street will hereafter control all of New York State east of Binghamton and Syracuse.

National Berline Sedan Is Here.



wishes to impress the New York public

Although the automobile show season is several months off, one enterprising concern, the Poertner Motor Car Company, Inc., is having a show all its own at 1759 Broadway, and here one can get an idea of what to look forward to for new ideas in the cars of next season.

Only National cars of closed types are being shown, as William C. Poertner, president of the Poertner company, wishes to impress the New York public concealed tollet and smoking cases and twelve cylinder chassis, on both six and twelve cylinder chassis. This sedan is a large, roomy job, built for seven passengers. There are two doors, one on either side. On the left, or driver's side, the door is located for ment. On the right side the door is in the centre of the car and enters to the concealed tollet and smoking cases and tween the front seats connecting front compary. concealed toilet and smoking cases and tween the front seats connecting front

with his unusual line of National closed other novel features.

The new National touring sedan is a easily accessible to one another.

ONLY TWO WEEKS MORE!

Hudebaker

PRICES ADVANCE SEPT. 15th

The Standard Touring Models will increase

FOUR \$985 to \$1050 SIX \$1250 to \$1385

Other Models will advance proportionately.

VOU will probably never have another opportunity to purchase an automobile of such power, size, and quality for so little money.

Other manufacturers of cars in the Studebaker class have already advanced their prices for the second time this year and are now announcing a third increase.

Because of large purchases and long term contracts for raw materials made a year ago, Studebaker is able to offer its cars at present low prices.

DON'T DELAY-ORDER AT ONCE and Save Money

NEW YORK SHOWROOMS, 56th St. & Broadway

New York Telephone, Circle 1400. **BROOKLYN BRANCH** 1291 Bedford Ave., Brooklyn

BRONX BRANCH 361 East 149th St. Telephone Decatur 1484. Telephone Metrose 4195